ACTIVITY 15

DECIDING TO CLEAN THE AIR

This activity lets students practice making choices and experience the sometimes difficult process of making decisions related to air pollution. It is related to the warm-ups called "The Big Picture," and "Making Decisions." Related activities include "Lifestyles and the Environment," "How Green Are We?," "Designing a Clean-Air Environment," "Choosing a Better Future," and "Writing Environmental Laws."

CRITICAL OBJECTIVES

- Understand the impact of choices on the nature and quality of life
- Understand the process for making decisions
- Recognize that different people have different perspectives on the same air pollution issue

SKILLS

- Researching
- Comparing ideas
- Considering alternatives
- Making and justifying decisions

GUEST PRESENTERS

Guest presenters could include EPA environmental protection, risk assessment, or enforcement specialists, environmental scientists, or lawyers.

BACKGROUND

Whether we are children or adults, our lives are influenced by a constant series of choices. Some choices we make for ourselves. Some are made by parents for their children, and many are made by people we don't even know. The combinations of all of these choices determine the quality of each of our lives. Making these choices is not easy because sometimes what a person perceives as the right choice for him or her as an individual may be perceived as the wrong choice for the neighborhood, the community, or the Nation. For example, a person may not want to join a car pool to get to school or work in the morning because it means coordinating his or her schedule with someone else's and, maybe, getting up earlier in the morning to be ready on time.

The combination of choices made by individuals, business and industry owners, and government over the years has had a huge impact on

RELATED WARM-UPS
C, G

REFER TO READING MATERIALS
"Automobiles and Air Pollution"
"The Clean Air Act"

TARGET GRADE LEVEL
6th - 12th

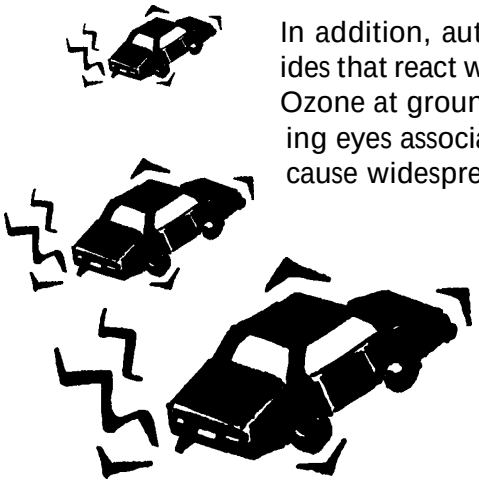
DURATION
2 class periods (80-90 minutes)

VOCABULARY
Acetaldehyde
Auto emissions
Benzene
Carcinogens
Clean fuel
Criteria pollutants
Formaldehyde
Hydrocarbons
Nitrogen oxides
Non-attainment area
Ozone
Particulate matter
Smoke
Soot
Standards

WORKSHEETS INCLUDED
1

the quality of the air we breathe and the air pollution problems the world faces today. For example, as a country, we have chosen to pay the higher prices of cars with emission control systems in order to reduce pollution from motor vehicles.

Auto exhaust is a major contributor to air pollution. Automobiles emit several pollutants that EPA classifies as probable or definite carcinogens, including benzene, formaldehyde, acetaldehyde, and particulates (soot or smoke, especially from diesel vehicles). EPA estimates that toxic emissions from cars, trucks, and buses could be responsible for as many as 1,500 cases of cancer each year. (See reading material on "Automobiles and Air Pollution.")



In addition, automobile exhaust contains hydrocarbons and nitrogen oxides that react with sunlight to create ozone, the major component of smog. Ozone at ground level is responsible for the choking, coughing, and stinging eyes associated with smog. Ozone also inhibits plant growth and can cause widespread damage to crops and forests. In typical urban areas, at least half of the hydrocarbons and nitrogen oxides come from motor vehicles. Nitrogen oxides also are produced by power plants, factories, and even lawnmowers. Hydrocarbons are found in many consumer products, including paints, hair spray, charcoal starter fluid, solvents, and plastic "popcorn" or "bubble" packaging. EPA sets national standards for ozone (one of the six widespread “criteria pollutants”), and the states must take action to ensure that standards are met. Areas that fail to meet the standards for at least one criteria air pollutant are called “non-attainment areas.” (See reading material on "The Clean Air Act.”)

Many of the smog clean-up requirements involve motor vehicles (cars, trucks, buses) because virtually everyone is exposed to their emissions. Also, as the pollution gets worse, pollution controls are required for smaller sources. Strategies that may be required by law to reduce and control these toxic emissions include state permitting programs, changes in the composition of gasoline, use of alternative fuels (such as natural gas and electricity), and use restrictions imposed by individual communities.

Many new and innovative approaches are being taken by local governments across the country to reduce air pollution in non-attainment areas. Some of these options include:

- Banning charcoal barbecues and wood burning in stoves or fire places when pollution levels are high
- Developing high-occupancy vehicle (HOV) programs for local highways to encourage car pooling
- Restricting traffic in specific areas of the city
- Providing incentives for citizens to use public transportation systems
- Expanding public transportation systems using clean-fueled vehicles,

such as municipal buses that use compressed natural gas (CNG) or electric trolley buses
- Eliminating payments by employers that reduce parking costs of employees who do not car pool
- Requiring employers to contribute to employee mass transit costs
- Assessing "smog fees" on cars in proportion to the number of miles driven and vehicle emissions produced
- Requiring more stringent vapor recovery at gas stations
- Requiring large companies to purchase fleet cars that run on clean fuel
- Buying and scrapping older cars

WHAT TO DO

Class #1

1. Explain that the class is going to act out a situation that illustrates the difficult process of making clean air choices. For the exercise, students are to assume that there has been a proposal brought before the city (town) council to close the downtown commercial district to automobile traffic because of the pollution level and traffic congestion. Under the proposal, only fire and police emergency and public transit (buses) vehicles would be allowed on downtown streets between the hours of 8:00 am and 6:00 pm.

2. Divide the class into 8 teams. Explain that each team will represent one of the "players" in this drama: three city (town) council members, two citizens, two downtown business owners, and one impartial expert that has been paid to evaluate the impacts of the proposal and report to the council (you may choose to be more specific about the roles to approximate the makeup of your community). Assign a role to each team and explain that each team will have to choose (not now) one team member to be the actor when the drama is played out at next week's class (give a specific date but allow a few days to prepare).

3. Explain that in order to act out the role they have been assigned, each team will have to define the characteristics and views of that person. Does the character live in the city (town) or out in the suburbs (in a rural area)? What does the person do for a living and where does he or she work? How does the person get to and from work? Does the person have a family? Where does the person shop? The last page of this activity is a sample "Character Attribute" worksheet that each team can fill out to help define its role.

4. Explain that once each team has defined its character, the team should define the character's concerns related to the proposal. Stress that this should go beyond deciding whether the character would be "for" or "against" the proposal and should include defining why this particular character might feel one way or the other. Encourage students to talk to their parents, local city (town) council members, and business owners to help develop these perspectives.

5. Explain that for the role-play activity, the actor from each team will have to describe the team's character and make a statement about that person's views on the proposal as if the character were addressing the council members during a meeting. (Remind the council members that they have a broader responsibility to the community and should be prepared, if necessary, to make a choice between their own individual views and what's best for the community as a whole.)

6. Give students the remainder of the class to work together and assign them to continue work outside of class in order to be prepared for the role-play activity.

Class #2

1. Arrange desks or a table at the front of the room with chairs to accommodate the three city (town) council members. Place a lectern, desk, or small table somewhere else in the room from which the expert, citizens, and business owners will make their statements.

2. Instruct the actor from each team to describe the team's character (based on the worksheet completed by the team). Have the expert deliver his or her impartial report to the council members and audience at the council meeting. Have the citizens and business owners state their views on the proposal. Have each council member make a similar statement.

TAKE NOTE! In the event that all teams take the same position on the proposal, be prepared to offer an opposing argument yourself, so that both sides of the issue will be heard by the class.

3. Ask the council members to vote. Examine the results. How did each member vote? How did they decide what to vote? Discuss the results and the choices involved with the class.

SUGGESTED EXTENSIONS (OPTIONAL)

- Have students bring in examples throughout the year, from the newspaper or local television news, of real air pollution-related decisions made by your local government or major local businesses. Set aside time periodically to discuss the choices involved in these decisions and their impact on the quality of life.

SUGGESTED READING

Asay, Gregory. "Acting Locally (Students and College Administration Work Together on Environmental Programs)." *Environmental Action Magazine*, 24 (December 1993) p. 21.

Becklake, John. *Thinking for the Future: Pollution*. New York: Gloucester Press (1990).

Environmental Crisis—Opposing Viewpoints. San Diego, CA: Greenhaven Press (1991).

Krupnick, Alan J., and Paul R. Portney. "Controlling Urban Air Pollution: A Benefit-Cost Assessment." *Science*, 252 (26 April 1991) p. 522.

Leinwand, Gerald. *The Environment: American Issues*. New York: Facts on File (1990).

Watson, Bates, and Kennedy. *Air Pollution, the Automobile, and Public Health*. National Academy Press (1988).

Willis, Terri, and Wallace B. Black. *Cars: An Environmental Challenge*. Children's Press (1992).

Worldwatch Paper 98: Alternatives to the Automobile. Washington, DC: Worldwatch (1990).

STUDENT WORKSHEET 1
DECIDING TO CLEAN THE AIR
CHARACTER ATTRIBUTES

Name: _____

Family Members (include ages of children, if any): _____

_____

Occupation (include type of business, if any): _____

Where Do You Live (in the city, suburbs, rural area)? _____

Where Do You Work (in the city, suburbs, rural area)? _____

How Do You Get To And From Work? _____

How Long Does Your Commute Take? _____

Where Do You Do The Shopping? _____

Are There Other Occasions You Need To Be Downtown During The Restricted Hours? _____

_____

What Do You Like About The Proposal? _____

_____

What Don't You Like About The Proposal? _____

_____

_____

Are You For Or Against The Proposal? How Strongly Do You Feel About It? _____

_____

Are There Any Modifications To The Proposal You Want to Suggest to the Council? _____

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